



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; border: none; padding: 5px;"> <p>(21) International Application Number: PCT/US99/25429</p> <p>(22) International Filing Date: 28 October 1999 (28.10.99)</p> <p>(30) Priority Data: 09/183,732 30 October 1998 (30.10.98) US</p> <p>(71) Applicant (for all designated States except US): INTEL CORPORATION [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): WILLIAMS, Christopher, D. [US/US]; 687 Pau Hana Drive, Soquel, CA 95073 (US). IKI, Jean, M., Goldschmidt [US/US]; 475 Milan Drive #107, San Jose, CA 95134 (US). SHAH-NAZAROFF, Anthony, A. [US/US]; 779 Hilmar Street, Santa Clara, CA 95050 (US). MOORE, Kenneth, A. [US/US]; 151 Lanita Drive, Ben Lomond, CA 95005 (US). HACKSON, David, N. [US/US]; 1533 Ashcroft Way, Sunnyvale, CA 94087 (US).</p> <p>(74) Agents: MILLIKEN, Darren, J. et al.; Blakely, Sokoloff, Taylor &amp; Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (US).</p> </td> <td style="width: 50%; vertical-align: top; border: none; padding: 5px;"> <p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i></p> </td> </tr> </table>			<p>(21) International Application Number: PCT/US99/25429</p> <p>(22) International Filing Date: 28 October 1999 (28.10.99)</p> <p>(30) Priority Data: 09/183,732 30 October 1998 (30.10.98) US</p> <p>(71) Applicant (for all designated States except US): INTEL CORPORATION [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): WILLIAMS, Christopher, D. [US/US]; 687 Pau Hana Drive, Soquel, CA 95073 (US). IKI, Jean, M., Goldschmidt [US/US]; 475 Milan Drive #107, San Jose, CA 95134 (US). SHAH-NAZAROFF, Anthony, A. [US/US]; 779 Hilmar Street, Santa Clara, CA 95050 (US). MOORE, Kenneth, A. [US/US]; 151 Lanita Drive, Ben Lomond, CA 95005 (US). HACKSON, David, N. [US/US]; 1533 Ashcroft Way, Sunnyvale, CA 94087 (US).</p> <p>(74) Agents: MILLIKEN, Darren, J. et al.; Blakely, Sokoloff, Taylor &amp; Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (US).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i></p>
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<p>(54) Title: METHOD AND APPARATUS FOR CHANNEL SURFING THROUGH MULTIPLE SOURCES BASED ON USER-DEFINABLE PREFERENCES</p>				
<p>(57) Abstract</p> <p>A method and apparatus for channel surfing through multiple sources based on a user-definable preferences list (Figure 3) that identifies a plurality of channels from a plurality of different sources (304, 306). One of the plurality of identified channels is selected for provision by the user (308, 310).</p>				
<pre> graph TD     302[RECEIVE NEW CHANNEL REQUEST] --&gt; 304[IDENTIFY APPROPRIATE PREFERENCES LIST]     304 --&gt; 306[ACCESS PREFERENCES LIST]     306 --&gt; 308[DETERMINE NEXT CHANNEL BASED ON PREFERENCES LIST]     308 --&gt; 310[TUNE APPROPRIATE COMPONENT TO NEXT CHANNEL]           </pre>				

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**METHOD AND APPARATUS FOR CHANNEL SURFING THROUGH  
MULTIPLE SOURCES BASED ON USER-DEFINABLE PREFERENCES**

**BACKGROUND OF THE INVENTION**

**Field of the Invention**

The present invention pertains to the field of entertainment systems. More particularly, this invention relates to allowing users to channel surf through multiple sources based on user-definable preferences.

**Background**

A recent trend in the electronics and computer industry is the convergence of computer systems and more traditional entertainment system components. Such convergence allows an increasingly broad range of information to be made available for system users over and above the broadcast television programming which has long been provided via conventional, televisions. Accompanying this convergence is the expansion of television programming transport media (e.g., the mechanism or "pipe" via which the programming is transported to the television). While analog broadcasts and analog cable were once the standard transport media for television programming, digital cable and digital satellite systems are becoming more and more commonplace. Additionally, other transport media, such as digital broadcasts, are starting to appear as options for viewers.

Using different transport media has increased the number of sources from which television programming can be received, and thus has also increased the number of television programs available for viewing. These increases are due to both the increase in number of transport media, as well as the additional bandwidth capabilities of some of the newer types of transport media. Additionally, other "local" sources (e.g., video cassette recorders) can also supply programming, thereby further increasing the programming options available to users. Furthermore, this convergence of computer systems and more traditional entertainment system components can result in different types of programming becoming available to users. For example, analog radio broadcasts or digital cable music broadcasts can be made available to the user through such convergence systems.

traditional entertainment system components can result in different types of programming becoming available to users. For example, analog radio broadcasts or digital cable music broadcasts can be made available to the user through such convergence systems.

However, one problem presented with convergence systems is the ease in which a user can choose from the large number of programming choices available. While a user may have had a choice of a dozen local broadcast channels or 30-40 cable channels a few years ago, the additional transport media currently being used has increased programming options into the hundreds, and will commonly be in the thousands in the not-too-distant future. The time required for the user to "surf" through all such channels from a variety of different sources becomes burdensome, thereby reducing the user's enjoyment of the system. Furthermore, in many situations a user will simply be interested in watching and/or listening to the programming, and not be particularly interested in what the source (e.g., analog broadcast or analog cable) is.

Therefore, a need exists for an improved way for a user to surf through channels from a variety of different sources.

### SUMMARY OF THE INVENTION

A method and apparatus for channel surfing through multiple sources based on user-definable preferences is described herein. According to one aspect of the present invention, a computerized method includes accessing a user-definable preferences list that identifies a plurality of channels from a plurality of different sources, and selecting one of the plurality of identified channels for provision to a user.

According to one aspect of the present invention, an article includes a storage medium, the storage medium having stored thereon a plurality of instructions that, when executed by a processor, result in accessing a user-definable preferences list that identifies a plurality of channels from a plurality of different sources, and selecting one of the plurality of channels for provision to a user.

According to one aspect of the present invention, an apparatus includes a storage device to store a user-definable preferences list that identifies a plurality of channels from a plurality of different sources, and a channel selection controller, coupled to the storage device, to access the user-definable preferences list and select one of the plurality of channels for provision to a user.

### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

Figure 1 is a block diagram illustrating the system components of an exemplary entertainment system in which one embodiment of the present invention may be practiced;

Figure 2 is a block diagram illustrating the architecture of a system controller according to one embodiment of the present invention;

Figure 3 is a flowchart illustrating the steps followed in allowing a user to channel surf through multiple sources according to one embodiment of the present invention;

Figure 4 illustrates preferences lists according to one embodiment of the present invention;

Figure 5 illustrates an example electronic programming guide database according to one embodiment of the present invention;

Figure 6 is a flowchart illustrating the steps followed in allowing updating of the user preferences lists according to one embodiment of the present invention; and

Figure 7 illustrates one embodiment of a computing device suitable for use with the present invention.

### DETAILED DESCRIPTION

In the following detailed description numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be

understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances well known methods, procedures, components, and circuits have not been described in detail so as not to obscure the present invention.

Parts of the description will be presented in terms of operations performed by a computer system, using terms such as data, flags, bits, values, characters, strings, numbers and the like, consistent with the manner commonly employed by those skilled in the art to convey the substance of their work to others skilled in the art. As is well understood by those skilled in the art, these quantities take the form of electrical,

magnetic, or optical signals capable of being stored, transferred, combined, and otherwise manipulated through mechanical and electrical components of the computer system; and the term computer system includes general purpose as well as special purpose data processing machines, systems, and the like, that are standalone, adjunct or embedded.

Additionally, various operations will be described as multiple discrete steps in turn in a manner that is helpful in understanding the present invention. However, the order of description should not be construed as to imply that these operations are necessarily order dependent, in particular, the order of their presentations.

The present invention provides a method and apparatus for channel surfing through multiple sources based on user-definable preferences. One or more userdefinable preferences lists that identify multiple different channels from a variety of different sources are maintained by the present invention. A user is able to surf through the channels in a preferences list rather than being required to surf through the entire range of channels, and furthermore can do so without concern for which source a particular channel corresponds to.

As used herein, a "channel" refers to a particular communication path from a source (e.g., particular frequencies transmitted by analog television broadcast and cable sources or radio stations) or origination location of a source (e.g., location identifiers (such as uniform resource locators (URLs)) of network servers). Many sources will include multiple channels.

Figure 1 is a block diagram illustrating the system components of an exemplary entertainment system in which one embodiment of the present invention may be practiced. System 100 operates to provide (e.g., display, play, etc.) audio and/or video programming to a user(s). System 100 includes television/display device 102, video recorder/playback device 106, digital video disk (DVD, also referred to as digital versatile disk) recorder/playback device 114, audio/video tuner and/or amplifier 110, audio playback/recorder device 122, and compact disc (CD) player 112, all coupled to a common input/output (I/O) bus 108. It is to be appreciated that the use of the common I/O bus 108 is for ease of explanation in the diagram only, and that a number of alternative means of routing input and output signals may be beneficially employed. For example, audio input and output could be routed with an appropriate number of independent audio "patch" cables, video signals may be routed with independent coaxial cables, and control signals may be routed along a two-wire serial line, or through infrared (IR) communication signals or radio frequency (RF) communication signals. By way of

further example, audio, video, and/or control signals may also be routed along one or more buses in accordance with the Universal Serial Bus Specification, Revision 1.0 (January 15, 1996), or the High Performance Serial Bus IEEE Standard 1394, IEEE std. 1394-1995, draft 8.00, approved December 12, 1995.

In addition, system 100 includes speaker system 116, microphone 118, video camera 120 and a wireless input/output control device 132. In one embodiment, wireless I/O control device 132 is an entertainment system remote control unit which communicates with the components of system 100 through IR signals. In another embodiment, wireless I/O control device 132 may be a wireless keyboard and/or cursor control device that communicates with the components of system 100 through IR signals or RF signals. In yet another embodiment, wireless I/O control device 132 may be an IR or RF remote control device similar in appearance to a typical entertainment system remote control with the added feature of a track-ball or other cursor control mechanism that allows a user to position a cursor on a display of system 100.

At the core of system 100 is system controller 104 incorporated with the features of the present invention, configured to control a variety of features associated with the system components. As depicted, system controller 104 is coupled to each of the system components, as necessary, through I/O bus 108. In one embodiment, in addition to or in place of I/O bus 108, system controller 104 may be configured with a wireless communications transmitter (or transceiver), which is capable of communicating with the system components via IR signals or RF signals 108'. Regardless of the control medium, system controller 104 is configured to control each of the entertainment system components of system 100, although it is understood that each of the components may be individually controlled with wireless I/O device 132.

System controller 104 retrieves and stores entertainment programming information available from a wide variety of sources. During operation of system 100, system controller 104 dynamically configures the operating parameters of system 100 and offers additional value added features to enhance the user's enjoyment of system 100, as discussed in more detail below. In one embodiment, system controller 104 may be a computer system incorporated with the teachings of the present invention, as will be discussed in further detail below. In another embodiment, system controller 104 may be a "set-top" box endowed with the necessary processing power and incorporated with the teachings of the present invention. Regardless of the particular embodiment, system controller 104 may also be referred to as a "convergence system" designed to integrate the

world of entertainment systems and computing platforms to achieve the beneficial results discussed in greater detail below.

Although the present invention is described in the context of the exemplary embodiments presented in the figures, based on the descriptions to follow, those skilled in the art will appreciate that the present invention is not limited to these embodiments and may be practiced in a variety of alternate embodiments. Accordingly, the innovative features of the present invention may be practiced in a system of greater or lesser complexity than that of the system depicted in Figure 1. By way of example, devices may be added to system 100, or devices (e.g., video camera 120, microphone 118, DVD recorder/playback device 114, etc.) may be removed from system 100.

As illustrated in Figure 1, system 100 can be configured to receive audio/video programming input via a wide variety of transport media. In one embodiment, system 100 receives programming input via any or all of the following transport media: cable broadcast 124, satellite broadcast 126 (e.g., via a satellite dish), very high frequency (VHF) or ultra high frequency (UHF) radio frequency communication of the broadcast networks 134 (e.g., via an aerial antenna), and/or the telephone/computer network interface 128. Further, it will be appreciated by those skilled in the art that cable broadcast input 124, satellite broadcast input 126 and VHF/UHF input 134 may include analog and/or digital programming (e.g., digital high definition television (HDTV) programming). Additionally, audio/video programming may be received from a **CDROM**, **DVD**, or other digital or analog storage device via a playback device of system 100 (e.g., DVD recorder/playback device 114). The Internet, an entertainment network, or other network may also provide audio/video programming, via, for example, interface 128.

In addition to programming input, system 100 is also configured with a number of general purpose control outputs 130 which may be configured to control any number of devices. In one embodiment, for example, as system controller 104 configures system 100 to display a movie, it may also dim the lights in the room to a predetermined level to further enhance the viewing environment. Control circuitry which allows a computing device to control, for example, lighting, thermostat settings, and other household appliances (via, for example, the electrical wiring in a house) are well known in the art and thus will not be described further.

Except for the incorporated teachings of the present invention (to be more fully described below), system controller 104 is intended to represent a broad category of computing devices known in the art. An example of such a computing device is a



desktop computer system equipped with a high performance microprocessor(s), such as the Pentium® processor, Pentium® Pro processor, or Pentium® II processor manufactured by and commonly available from Intel Corporation of Santa Clara, California. Another example of such a computing device is an Internet "appliance" device, such as a WebTV™ Internet Terminal available from Sony Electronics Inc. of Park Ridge, New Jersey, or Philips Consumer Electronics Company of Knoxville, Tennessee. It is to be appreciated that the housing size and design for system controller 104 may be altered, allowing it to better visually fit into system 100.

It is also to be appreciated that the several entertainment system components depicted in Figure 1 can be beneficially combined. By way of example, system controller 104 could be integrated into television/display device 102, DVD recorder/playback device 114, or audio/video tuner and amplifier 110.

Figure 2 is a block diagram illustrating the architecture of a system controller according to one embodiment of the present invention. According to one implementation, system controller 104 of Figure 1 is a system controller 200 of Figure 2. As illustrated, system controller 200 includes operating system 202, component controller 204, electronic program-ning guide (EPG) controller 206, channel selection controller 208, and user interface (UI) controller 210. Operating system 202 represents any of a wide variety of conventional operating systems (such as the WindowSTM 95 or WindowSTM 98 operating systems available from Microsoft Corporation of Redmond, Washington), and operates to allow the controllers 204 - 210 to communicate with one another. Additionally, communication with other components within an entertainment system can also be provided by operating system 202, such as with the components illustrated in Figure 1.

Component controller 204 controls the various components within the entertainment system, such as those illustrated in Figure 1. Commands to change the various parameters of the components, such as channel selection or volume control, are sent to those components from component controller 204.

EPG controller 206 controls access to electronic programming guide (EPG) database 212. EPG database 212 is typically stored on a storage device within the entertainment system (such as a magnetic or optical disk), with selected portions being temporarily stored in system memory (such as random access memory). EPG controller 206 accesses database 212 and displays requested EPG data on a display device (e.g., device 102 of Figure 1). EPG controller 206 services requests for information from the

EPG database from other components of controller 200, such as UI controller 210 and channel selection controller 208.

Channel selection controller 208 controls the surfing through a user-definable preferences list(s) of the present invention. Channel selection controller 208 includes channel selector 221 and preferences control 222. Preferences control 222 interacts with preferences database 214 to allow a user to access and modify the stored preferences. When a user requests to be provided with a new channel, channel selector 221 accesses preferences database 214 and determines the next channel to be provided to the user. Preferences database 214 identifies channels available to the entertainment system from multiple different sources. Channel selector 221 also communicates with component controller 204 to communicate with the appropriate entertainment system component(s) as necessary to provide the new channel. The selection of the next channel in accordance with the present invention is discussed in more detail below.

According to one embodiment of the present invention, preferences database 214 includes different preferences lists for different users of the system. Thus, in this embodiment, the system needs to know the particular user (or alternatively may simply default to non-user specific preferences lists). Identification of a particular user can be made in any of a variety of conventional manners, such as by a user id log-in process, voice recognition, etc. Alternatively, separate user preferences may not be maintained by the system. In this alternate embodiment a global user preferences list(s) is used for all system users.

It should be noted that, as illustrated in Figure 2, the preferences information is independent of the EPG data. Thus, any changes that are made to the preferences information (e.g., channel additions or deletions) does not alter the EPG data which is available to the user. Thus, the channel preferences list(s) that can be surfed in accordance with the present invention do not alter the programming/channel data available for presentation from the EPG data.

The preferences lists stored within preferences database 214 can be received from a variety of sources. The preferences lists may be generated solely by the system user(s), the system can be pre-configured with default lists that can be subsequently updated by a user, default lists for particular areas (e.g., based on city or zip code) can be obtained from an external source (such as via a network (e.g., the Internet) or a CD ROM), etc.

Figure 3 is a flowchart illustrating the steps followed in allowing a user to channel surf through multiple sources according to one embodiment of the present invention.

Initially, channel selection controller 208 of Figure 2 receives a new channel request, step 302. This new channel request is input in any of a variety of conventional manners, such as by user selection of a "channel up" arrow or "channel down" arrow on a remote control device. Channel selector 221 then identifies an appropriate preferences list, step 304. Alternatively, if multiple preferences lists are not supported, then step 304 can be skipped.

Figure 4 illustrates preferences lists according to one embodiment of the present invention. Multiple (m) preferences lists 401 and 402 are illustrated. Each preferences list 401 and 402 can include multiple channel identifiers, such as channel identifiers 407, 408, and 409 of preferences list 401. Each of the channel identifiers corresponds to any one of multiple different sources (e.g., analog television broadcast, network server, radio broadcast, etc.). Additionally, multiple channels can correspond to the same source. The channel identifiers can be arranged in the preferences lists in any of a variety of manners, such as by source, by some user-defined order, by the order in which the identifiers were added to the list, arbitrarily, etc.

Each of the multiple preferences lists 401-402 can correspond to different users and/or categories. In the illustrated embodiment, the lists 401-402 are identified by their descriptors 411-412. Examples of such descriptors include, "User Joe Smith", "Sports", or "User Jane Smith; Country/Western". If at least one of preferences lists 401-402 corresponds to a particular user, then the appropriate preferences list is identified (step 304 of Figure 3) by searching the lists 401-402 for the current user of the entertainment system. This search may result in a single list, or alternatively may result in multiple lists (e.g., multiple category lists for that user, or at least one "generic" list in addition to possibly a category list for that user). If at least one of preferences lists 401-402 corresponds to a particular category, then the appropriate preferences list is also identified by searching the lists 401-402 for the category identified by the user. A specific category can be identified in a variety of manners, such as input to the system via a user interface (e.g., such as provided by UI interface 210 of Figure 2), or entry of a particular category from a remote control device (e.g., selection of a particular category button, selection of channel selection keys corresponding to a particular category, entry of a category name via an alphanumeric input, etc.).

According to one embodiment of the present invention, user-specific preferences lists as well as "generic" preferences lists (those that correspond to multiple users, such as all users) can be included in preferences lists 401-402. Thus, it is possible that multiple

preferences lists may correspond to a single user request. For example, preferences lists 401-402 may include a "sports" category for user Joe Smith, as well as a generic "sports" category for all users. In this situation, if user Joe Smith requests the new channel, then channel selector 221 selects one of these two preferences lists. This selection can be done in different manners for different implementations, such as by selecting the one that includes the user identification, randomly selecting one, selecting the one with greater (or fewer) entries, giving the user a choice of which he or she prefers, etc. Alternatively, both lists could be used (e.g., one after the other), etc.

Returning to Figure 3, once the appropriate preferences list is identified in step 304, channel selector 221 of Figure 2 accesses the identified preferences list, step 306. Based on the information within the accessed preferences list, channel selector 221 determines the next channel, step 308. The next channel can be identified in any of a range of manners. According to one implementation, channel selection controller 208 of Figure 2 maintains a record of the current channel being provided to the user by the entertainment system (e.g., controller 200 may monitor and keep track of any channel changes in the system). In this implementation, channel selector 221 compares the current channel being provided to the accessed preferences list. If the current channel being provided is in the accessed preferences list, then the channel in the preferences list subsequent to the current channel being provided is determined to be the next channel. The determination of which channel is subsequent can "wrap" around from the last to the first channels (e.g., channel identifier 409 of Figure 4 to channel identifier 407). If the current channel is not in the accessed preferences list, then the first channel in the preferences lists is determined to be the next channel. Alternatively, the next channel may simply be the channel in the preferences list subsequent to the previously identified channel in step 308, regardless of how long ago and how many intervening channels have been selected.

Once the next channel is determined in step 308, the appropriate component is "tuned" to that determined channel, step 310. This "tuning" process is accomplished by channel selection controller 208 sending a message to component controller 204 indicating the appropriate device within the entertainment system that is the source for the determined channel, as well as an identifier of the determined channel itself. Component controller 204 then sends the appropriate signal(s) to the appropriate component(s) of the entertainment system to tune to and provide the determined channel.

The appropriate component for tuning to the determined channel can be identified in different manners. According to one embodiment of the present invention, preferences lists 401-402 of Figure 4 include additional "tuning component" information 420 that identifies which component within the entertainment system is used to tune to which channels.

According to an alternate embodiment of the present invention, the EPG database 212 of Figure 2 is accessed to identify the appropriate component for tuning to the determined channel. An example EPG database is illustrated in Figure 5. As illustrated, database 500 includes channel identifiers 502, tuning component identifiers 504, and source descriptors 506. Additional information (e.g., show times, show description information such as title and actors/actresses, etc.) is also included in database 500 (but is not shown). Channel selection controller 208 of Figure 2 can access EPG database 500 and search the channel identifiers 502 for the determined channel (from step 308 of Figure 3). Upon locating the determined channel within database 500, controller 208 can then identify the tuning component corresponding to that channel based on the corresponding tuning component identifier 504. It should be noted that multiple entries will most likely exist for each channel, corresponding to different times and shows. As all of these entries would have the same tuning component, any one of them could be used to identify the tuning component corresponding to that channel.

It should be noted that the channel surfing method of the present invention can be initiated in any of a variety of manners. According to one implementation, the channel surfing method is initiated by selection of a "channel up" or "channel down" button on a remote control device. Alternatively, the channel surfing method may be initiated by activation of a dedicated button or switch on a remote control device, selection of an on-screen option (e.g., a graphical button or menu option), by voice command (e.g., "next channel" or "channel up"), etc.

Figure 6 is a flowchart illustrating the steps followed in allowing updating of the user preferences lists according to one embodiment of the present invention. An update request from a user is first received by channel selection controller 208 of Figure 2, step 602. In the illustrated embodiment, this request also includes an indication of the particular preferences list that is to be updated. The user can identify a particular preferences list in a range of manners, such as inputting the user identification and/or category of the list to be updated, or selecting from a list display provided by controller 208. According to one implementation, controller 208 provides additional security (e.g., password protection) to

prevent unauthorized access to the preferences list(s). In this implementation, controller 208 verifies the current user is authorized to access the lists, step 604. If the user is not authorized, then the process ends and no updating of the preference list(s) occurs. In an alternate implementation, no such checking is performed and processing flows from step 602 directly to step 606.

In step 606, preferences control 222 of Figure 2 access preferences database 214 to retrieve the identified preferences list and displays the list to the user (e.g., on display device 102 of Figure 1). Preferences control 222 then waits for a user input, step 608. In the illustrated embodiment, four user inputs are permitted: add channel, delete channel, reorder channel listings, and end. Inputs can be provided by a user in a variety of manners, such as by selection of buttons, menu options, or in a "drag and drop manner" via a graphical user interface provided by UI 2 10 of Figure 2, alphanumeric command and data inputs, etc.

If the "add channel" input is received, then preferences control 222 inserts into the list the channel identified by the input, step 610. If the "delete channel" input is received, then preferences control 222 removes from the list the channel identified by the input, step 614. If the "reorder channel listings" input is received, then preferences control 222 changes the order of the channels in the list in accordance with the input received, step 612. If the "end" input is received, then preferences control 222 stores the list as modified in steps 610-614, step 616.

Figure 7 illustrates one embodiment of a computing device suitable for use with the present invention. According to one implementation, system controller 104 of Figure 1 is a computing device 700 of Figure 7. In the illustrated embodiment of Figure 7, device 700 includes processor 702 and cache memory 704 coupled to each other as shown. Additionally, device 700 includes high performance input/output (I/O) bus 706 and standard I/O bus 708. Host bridge 710 couples processor 702 to high performance I/O bus 706, whereas I/O bus bridge 712 couples the two buses 706 and 708 to each other. Coupled to bus 706 are network/communication interface 724 and system memory 714. Coupled to bus 708 is mass storage 720, keyboard and pointing device 722, and I/O ports 726. Collectively, these elements are intended to represent a broad category of hardware systems, including but not limited to general purpose computer systems based on the Pentium® processor, Pentium® Pro processor, or Pentium® H processor, manufactured by Intel Corporation of Santa Clara, California.

In one embodiment, various electronic devices are also coupled to high

performance I/O bus 706. As illustrated, analog tuner/digital satellite/cable devices 728, are also coupled to high performance I/O bus 706 to allow device 700 to "tune" to various programming input channels.

These elements 702 - 728 perform their conventional functions known in the art. In particular, network/communication interface 724 is used to provide communication between device 700 and any of a wide range of conventional networks, such as an Ethernet, token ring, the Internet, etc. It is to be appreciated that the circuitry of interface 724 is dependent on the type of network the device 700 is being coupled to.

Mass storage 720 is used to provide permanent storage for the data and programming instructions to implement the above described functions, whereas system memory 714 is used to provide temporary storage for the data and programming instructions when executed by processor 702. I/O ports 726 are one or more serial and/or parallel communication ports used to provide communication between additional peripheral devices which may be coupled to device 700.

It is to be appreciated that various components of device 700 may be re-arranged. For example, cache 704 may be on-chip with processor 702. Alternatively, cache 704 and processor 702 may be packaged together as a "processor module", with processor 702 being referred to as the "processor core". Furthermore, certain implementations of the present invention may not require nor include all of the above components. For example, mass storage 720, keyboard and pointing device 722, and/or network/communication interface 724 may not be included in device 700. Additionally, the peripheral devices shown coupled to standard I/O bus 708 may be coupled to high performance I/O bus 706; in addition, in some implementations only a single bus may exist with the components of device 700 being coupled to the single bus. Furthermore, additional components may be included in device 700, such as additional processors, storage devices, or memories.

In one embodiment, the method and apparatus for channel surfing through multiple sources based on user-definable preferences according to the present invention as discussed above is implemented as a series of software routines run by device 700 of Figure 7. In this embodiment, controllers 204 - 210 of Figure 2 are each implemented as a series of software routines. These software routines comprise a plurality or series of instructions to be executed by a processor in a hardware system, such as processor 702 of Figure 7. Initially, the series of instructions are stored on a storage device, such as mass storage 720. It is to be appreciated that the series of instructions can be stored using any conventional storage medium, such as a diskette, CD-ROM, magnetic tape, DVD, laser

disk, ROM, Flash memory, etc. It is also to be appreciated that the series of instructions need not be stored locally, and could be received from a remote storage device, such as a server on a network, via network/communication interface 724. The instructions are copied from the storage device, such as mass storage 720, into memory 714 and then accessed and executed by processor 702. In one implementation, these software routines are written in the C++ programming language. It is to be appreciated, however, that these routines may be implemented in any of a wide variety of programming languages.

In alternate embodiments, the present invention is implemented in discrete hardware or firmware. For example, one or more application specific integrated circuits (ASICs) could be programmed with the above described functions of the present invention. By way of another example, controllers 204 - 210 of Figure 2 could be implemented in one or more ASICs of an additional circuit board for insertion into hardware system 700 of Figure 7.

In the discussions above, reference is made to particular "categories" of lists. It should be noted that any of a wide variety of categories can be used with the present invention, such as sports, country/western, classical, opera, movies, cartoons, etc. Additionally, personalized "favorites" categories can also be used, allowing the user to input particular channels that he or she prefers for whatever reasons.

Also in the discussion above, reference is made to identifying a "subsequent" channel in a preference list. It is to be appreciated that such subsequent channels can be identified in any of a wide range of manners, such as cycling through the list (either top to bottom or bottom to top) by a predetermined amount (e.g., one at a time), randomly selecting a channel, selecting according to some other pre-defined or dynamic ordering, etc. Additionally, selection could be based on source (e.g., radio stations first, then satellite, then cable, then television broadcast, etc.). Additionally, according to one alternate embodiment a "timeout" feature is included. The timeout feature causes the channel selector to return to its starting point in the preferences list (e.g., the first channel in the list) whenever a predetermined period of time (e.g., five minutes) passes without a channel selection from a user.

Additionally, in the illustrated embodiment the user is able to continuously cycle through the preferences list by repeated activation of the channel selection option (e.g., channel up or channel down buttons on a remote control device). According to one implementation, the present invention provides a visual or audio indication to the user when the user has completed one cycle of the preferences list.



Furthermore, according to an alternate embodiment, channel selector 221 includes an "automatic scan" function. In this embodiment, upon initiation of the channel surfing method of the present invention, channel selector 221 determines a next channel as discussed above with reference to Figure 3. However, channel selector 221 continues, at predetermined intervals (e.g., every five seconds) to select and tune to another new channel. Thus, in this embodiment channel selector 221 continues to select and tune to new channels automatically without requiring repeated user selection. This process continues until deactivated (e.g., by selection of the same channel selector that initiated the channel surfing, by completion of one cycle through the channels in the preferences list, etc.).

Therefore, the present invention provides for channel surfing through multiple sources based on user-definable preferences. One or more preferences lists can advantageously be maintained in accordance with the present invention and modified by individual users to their own liking. Each of the lists can include channel identifiers from multiple different sources, allowing the user to advantageously surf through channels from the different sources without concern for, and perhaps even knowledge of, those sources.

Thus, a method and apparatus for channel surfing through multiple sources based on user-definable preferences has been described. Whereas many alterations and modifications of the present invention will be comprehended by a person skilled in the art after having read the foregoing description, it is to be understood that the particular embodiments shown and described by way of illustration are in no way intended to be considered limiting. References to details of particular embodiments are not intended to limit the scope of the claims.

## CLAIMS

What is claimed is:

1. A computerized method comprising:  
accessing a user-definable preferences list that identifies a plurality of channels from a plurality of different sources; and  
selecting one of the plurality of identified channels for provision to a user.
2. The computerized method of claim 1, further comprising:  
providing, to the user, one or more of audio and video from a source corresponding to the selected one of the plurality of identified channels.
3. The computerized method of claim 1, further comprising:  
accessing, to determine a component corresponding to the selected one to the selected one of the plurality of identified channels, a programming guide database that is independent of the user-definable preferences list; and  
sending a signal to the component to provide the selected channel.
4. The computerized method of claim 1, further comprising:  
receiving a user request to provide a new channel; and  
wherein the accessing and the selecting are performed in response to the user request.
5. The computerized method of claim 4, further comprising:  
repeating the accessing and selecting in response to subsequent user requests to provide a new channel.
6. An article comprising:  
a storage medium; and

the storage medium having stored thereon a plurality of instructions that, when executed by a processor, result in accessing a user-definable preferences list that identifies a plurality of identified channels from a plurality of different sources, and selecting one of the plurality of channels for provision to a user.

7. The article of claim 6, wherein the plurality of instructions, when executed by the processor, further result in providing, to the user, one or more of audio and video from a source corresponding to the selected one of the plurality of identified channels.

8. The article of claim 6, wherein the plurality of instructions, when executed by the processor, further result in accessing, to determine a component corresponding to the selected one of the plurality of identified channels, a programming guide database that is independent of the user-definable preferences list, and sending a signal to the component to provide the selected channel.

9. The article of claim 6, wherein the plurality of instructions, when executed by the processor, further result in receiving a user request to provide a new channel, wherein the accessing and the selecting are performed in response to the user request.

10. The article of claim 9, wherein the plurality of instructions, when executed by the processor, further result in repeating the accessing and selecting in response to subsequent user requests to provide a new channel.

11. An apparatus comprising:

a storage device to store a user-definable preferences list that identifies a plurality of channels from a plurality of different sources; and

a channel selection controller, coupled to the storage device, to access the user-definable preferences list and select one of the plurality of identified channels for provision to a user.

12. The apparatus of claim 11, further comprising:

a component controller coupled to the channel selection controller;  
wherein the channel selection control is to send the selected one of the plurality of identified channels to the component controller, and wherein the component controller is to tune a corresponding component to provide, to the user, one or more of audio and video from a source corresponding to the selected one of the plurality of identified channels.

13. The apparatus of claim 11, wherein the channel selection controller is further to:  
access, to determine a component corresponding to the selected one of the plurality of channels, a programming guide database that is independent of the user-definable preferences list; and  
send a signal to the component to provide the selected channel.

14. The apparatus of claim 11, wherein the channel selection controller is further to:  
receive a user request to provide a new channel; and  
wherein the accessing and the selecting are performed in response to the user request.

15. The apparatus of claim 14, wherein the channel selection controller is further to repeat the accessing and selecting in response to subsequent user requests to provide a new channel.

16. An apparatus comprising:  
means for storing a user-definable preferences list that identifies a plurality of channels from a plurality of different sources; and  
means, coupled to the storage device, for accessing the user-definable preferences list and selecting one of the plurality of identified channels for provision to a user.

17. The apparatus of claim 16, further comprising:  
means, coupled to the means for accessing and selecting, for controlling components in an entertainment system; and

wherein the means for accessing and selecting is for sending the selected one of the plurality of identified channels to the means for controlling, and wherein the means for controlling is for tuning a corresponding component of the entertainment system to provide, to the user, one or more of audio and video from a source corresponding to the selected one to the plurality of identified channels.

18. The apparatus of claim 16, wherein the means for accessing and selecting includes:

means for accessing, to determine a component corresponding to the selected one of the plurality of identified channels, a programming guide database that is independent of the user-definable preferences list; and

means for send a signal to the component to provide the selected channel.

19. The apparatus of claim 16, wherein the means for accessing and selecting includes:

means for receiving a user request to provide a new channel; and

wherein the accessing and the selecting are preformed in response to the user request.

20. The apparatus of claim 19, wherein the mean for accessing and selecting includes means for repeating the accessing and selecting in response to subsequent user requests to provide a new channel.

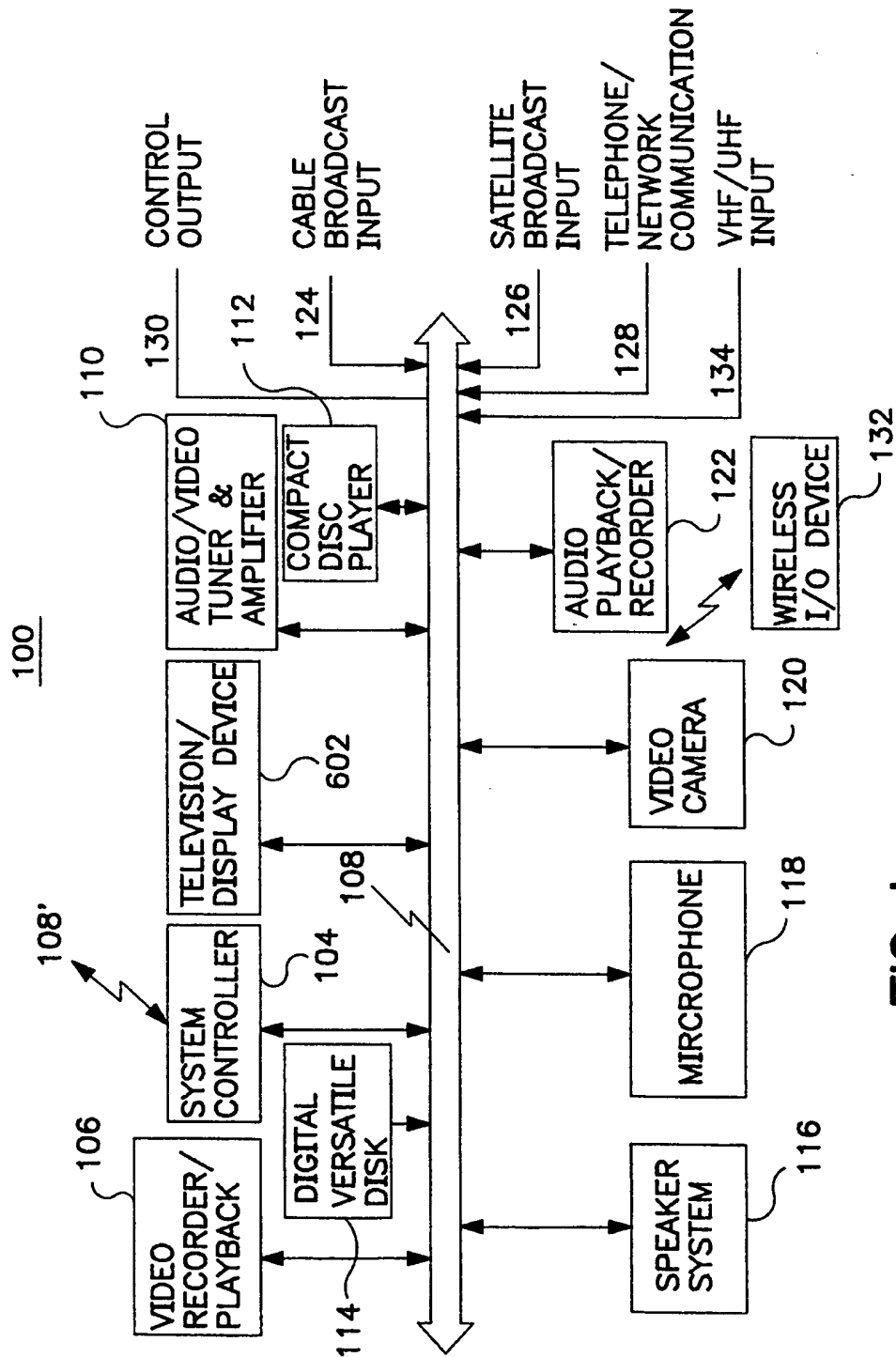


FIG. 1

2 / 7

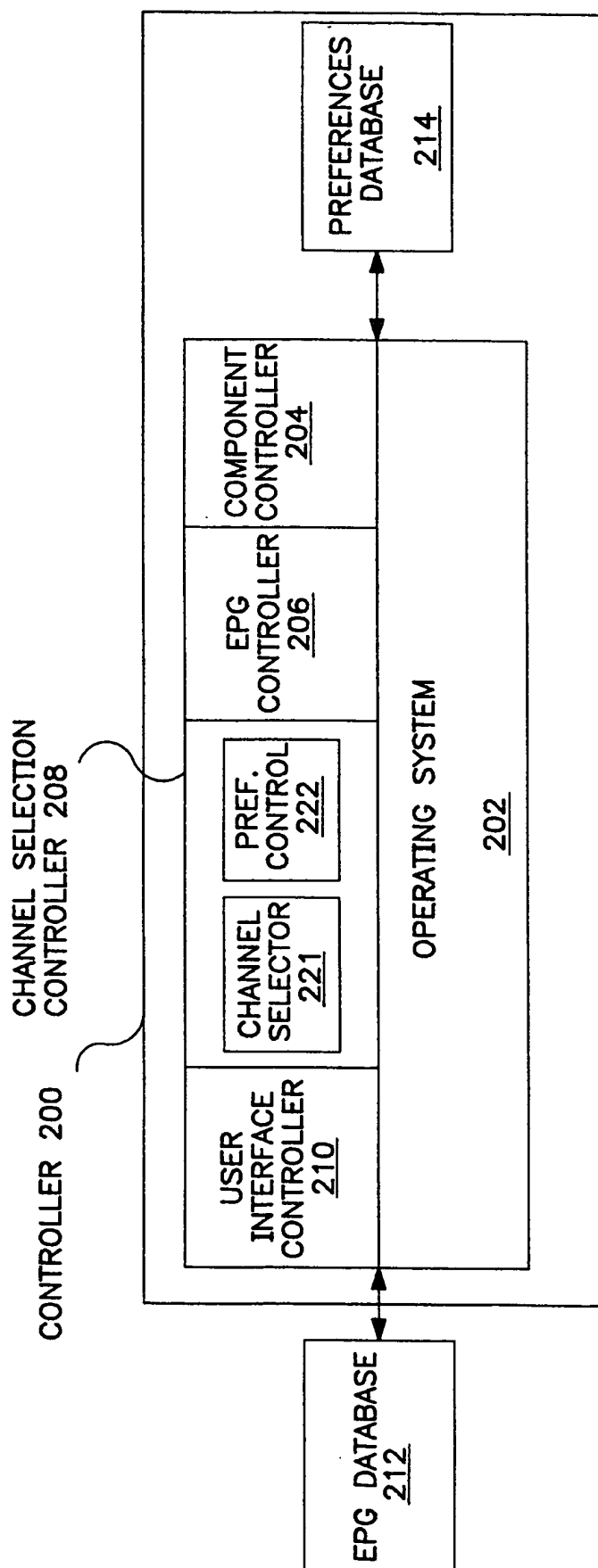


FIG. 2

3 / 7

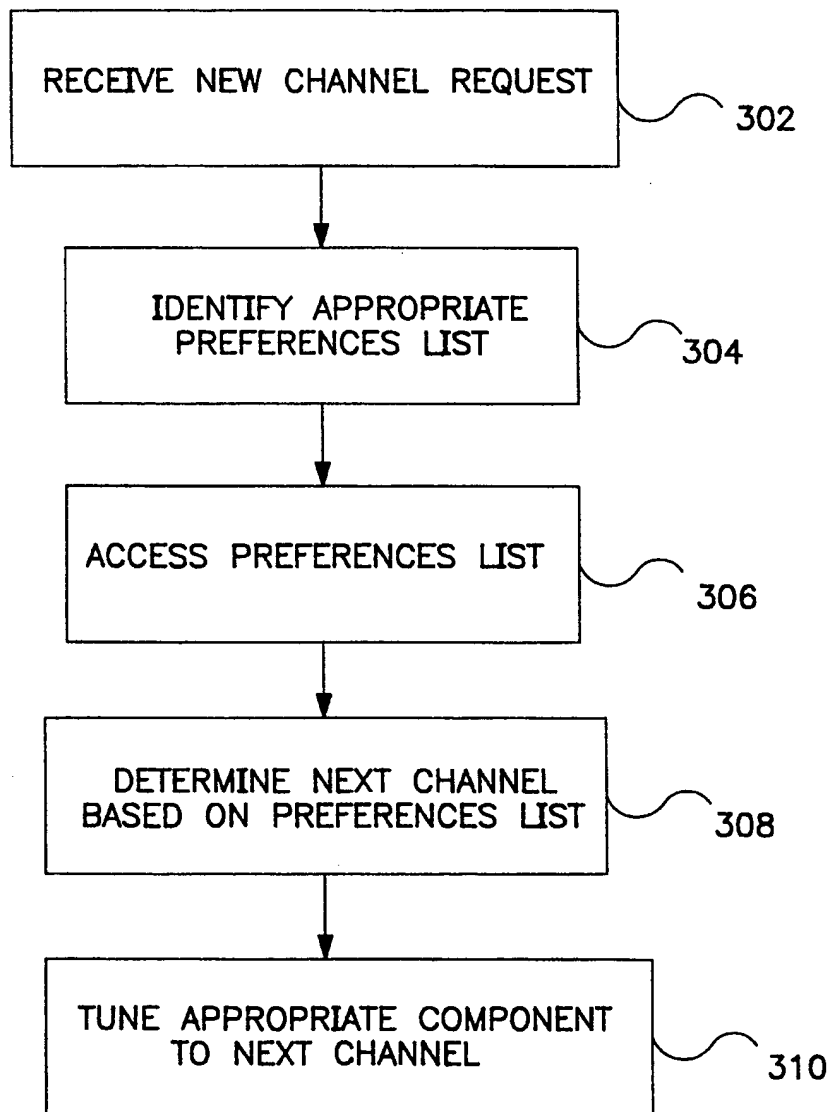


FIG. 3



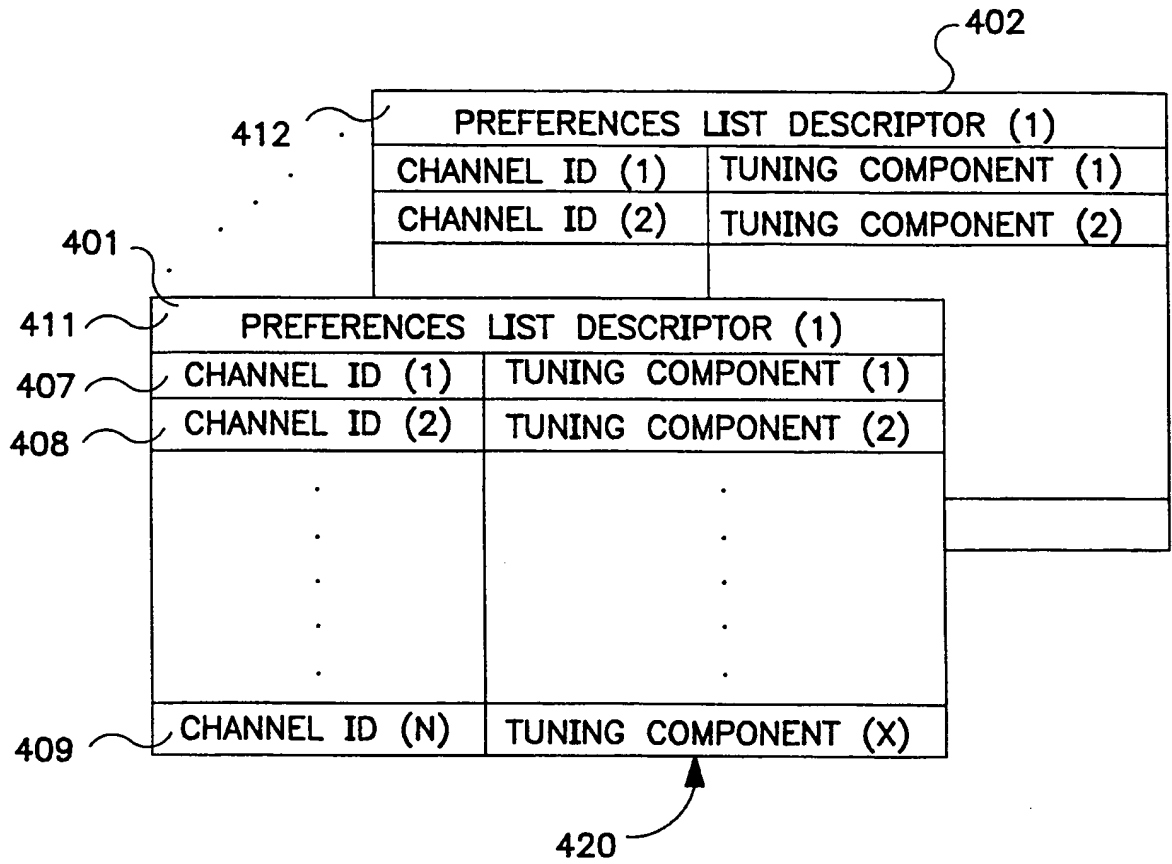


FIG. 4

500

502	504	506
CHANNEL IDENTIFIER	TUNING COMPONENT	SOURCE DESCRIPTION
32	CABLE BOX	COUNTRY/WESTERN MUSIC CHANNEL
210	SATELLITE DISH	COUNTRY/WESTERN MUSIC CHANNEL
DISK(1)	CD PLAYER	GARTH BROOKS GREATEST HITS
102.9	STEREO TUNER	WXYZ RADIO STATION
.		
.		
.		

FIG. 5

6 / 7

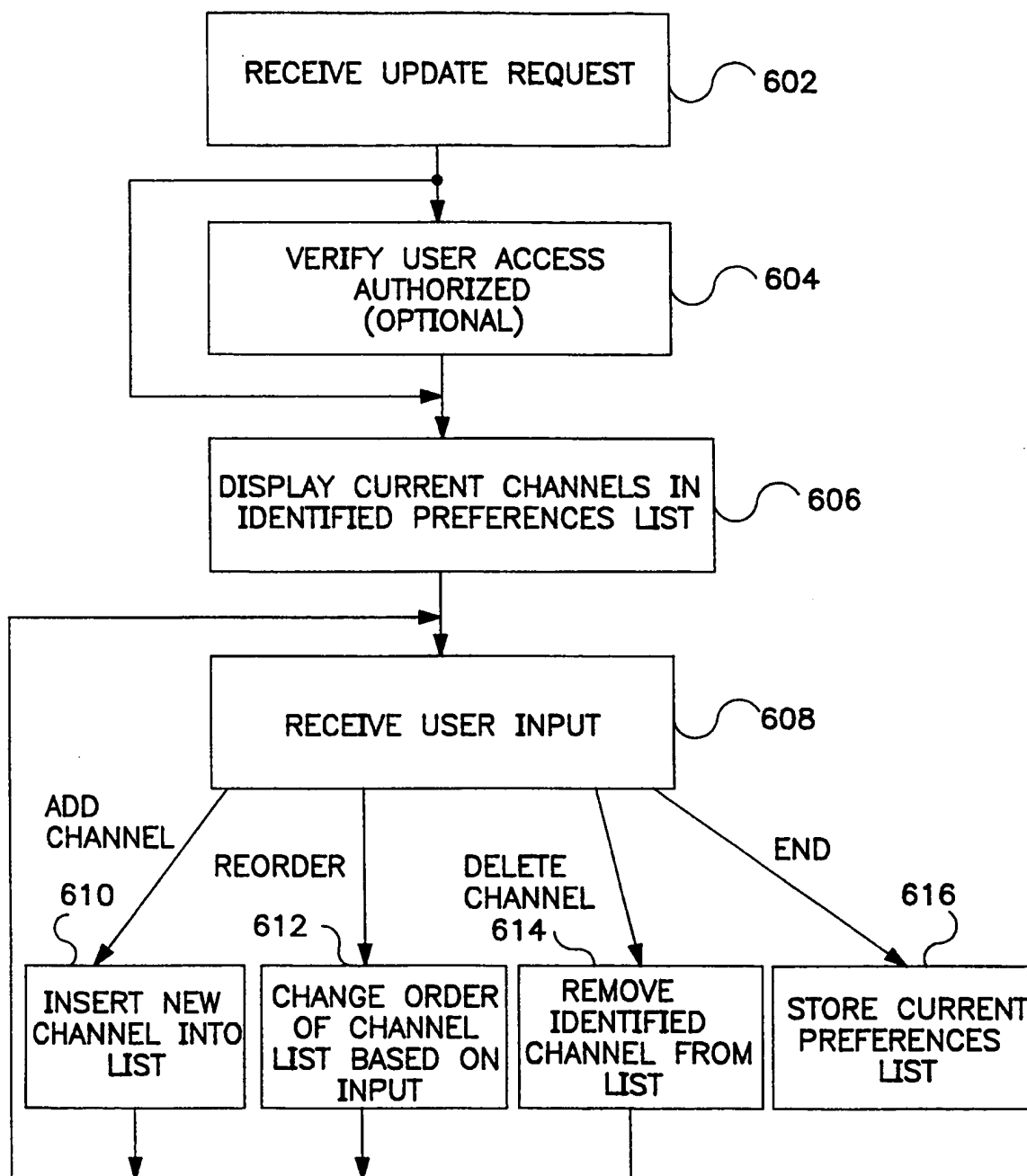


FIG. 6

700

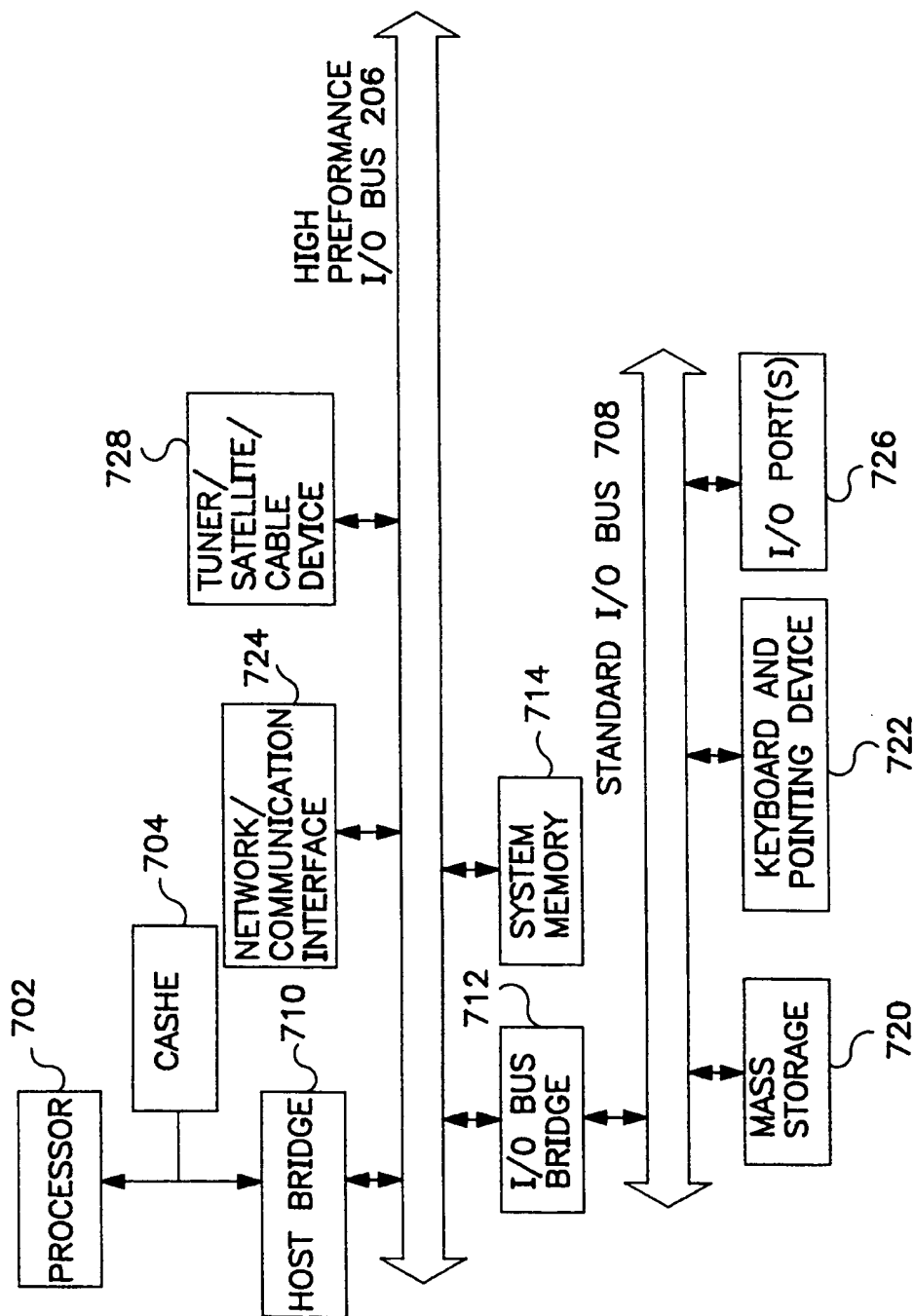


FIG. 7

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/25429

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC( ) : 345/327; 348/10, 906; 455/6.2

US CL : H04N 7/10

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/327; 348/6, 10, 906; 455/3.1, 4.1, 4.2, 6.1, 6.2; H04N 7/10; H04H 1/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,594,509 A (FLORIN et al) 14 January 1997, see whole document.	1-20
X	US 5,596,373 A (WHITE et al) 21 January 1997, see whole document.	1-20
X	US 5,694,176 A (BRUETTE et al) 02 December 1997, see whole document.	1-20
X	US 5,699,125 A (RZESZEWSKI et al) 16 December 1997, see whole document.	1-20
X	US 5,781,246 A (ALTEN et al) 14 July 1998, see whole document.	1-20

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

17 DECEMBER 1999

Date of mailing of the international search report

08 FEB 2000

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

JOHN W. MILLER

Telephone No. (703) 305-4795

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/25429

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,784,095 A (ROBBINS et al) 21 July 1998, see whole document.	1-20